OVERVIEW OF MIM AND ROLL BACK MALARIA

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PLENARY PRESENTATION

The Multilateral Initiative on Malaria: from Dakar to Durban and Beyond

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My task today, as assigned by the organisers, is to give a brief summary of what the donor agencies believe the **Multilateral Initiative on Malaria (MIM)** has achieved in the first few years of its operation. I would like to start with the general objectives of MIM, then talk through some of the specific developments that have taken place and explain some of the exciting research advances, before finally turning to what might be achieved in the coming few years.

I should say at the outset that the Wellcome Trust has very much enjoyed being part of this process and has been honoured to act as the nominated co-ordinator of MIM for this past year. Indeed the Trust has built up many wonderful collaborations and friendships with its partners throughout the world, both scientists and funding agencies.

The primary objective of MIM is "**to strengthen and sustain through collaborative research and training the capacity of malaria endemic countries in Africa to carry out research** ". This is a very laudable and important aim, and one in which I think significant progress has been made in the first two years. Particular emphases of MIM have been on promoting global communication and co-ordination, mobilising resources, building research capacity and then linking research to policy and practice. The aim was and is to encourage communication at many different levels: between scientists, medical research staff, and public health researchers, and importantly between funding agencies, to optimise the use of resources and avoid duplication of effort. A year or so into the life-span of MIM, the very exciting development from the World Health Organisation of '**Roll Back Malaria** ' was announced, and indeed a partnership between this new project and MIM represents a wonderful mechanism for taking forward the process of linking fundamental and applied research to policy and practice. Too often in the past there have been major research advances, but these have been slow to be translated into public health practice.

The meeting held in Dakar, Senegal in January 1997 was a very important event and discussions there centered on key research priorities and needs. Follow up meetings in the Hague and London then attempted to refine priorities for concerted action, and the Wellcome Trust became involved as a co-ordinator at the London meeting. The areas agreed upon for concerted action, by both scientists and funders, focused very particularly on addressing key research priorities and gaps, and exploiting scientific opportunities.

A number of recurring themes emerged from Dakar, which cut across different subject areas, and I would like to turn briefly to some of these. Clearly one of the most important issues identified was the isolation of scientists in Africa and the need for greater interaction and communication both across Africa and with the rest of the global scientific community. The issue of effective communication is an old theme, not specific to malaria, and it is a theme that is common across the biomedical and indeed the scientific and technological fields. A need for the standardisation of research methodologies and

reagents at different sites across Africa to enable comparison of results was also highlighted. In addition, there was much comment about the need for the creation of databases, for example, to track the evolution of drug resistance or assess if the incidence of malaria is declining or increasing in particular sites. These databases, of course, should be fully accessible to workers of all kinds, and particularly within the African continent, where longitudinal epidemiological data is required for planning disease control strategies. Another theme was the creation of networks, which can link together fragmented and isolated research resources to try to generate much greater impact. Multi-centre studies are often required to answer specific research questions, where single sites cannot achieve the sample sizes required to obtain definitive answers. Lastly the need for a repository of well-characterised research reagents was identified, such that scientists throughout the world could have access to a common stock for application in studies at different sites. These 'Dakar' themes have been the bedrock of what MIM has attempted to do in the last two years.

What are the key features of MIM? It is a loose alliance of organisations and individuals, including scientists, funding agencies, commercial organisations and those involved in the practical aspects of disease control. It is not a central funding body in itself, but it has nevertheless successfully drawn additional resources into malaria research, both through pre-existing schemes and through the establishment of new schemes. Of course, from its birth MIM has had teething troubles; and that is always to be expected with any ground breaking initiative. However, I have been very impressed, as an interested bystander, that those teething problems have been sorted out very quickly and indeed very warm friendships and collaborations have been developed between the partners. Perhaps one of MIM's most important roles has been as a focal point for communication between partners, and we see by the very occurrence of this Conference how well that focal point has served in bringing scientists together from all parts of Africa and all over the world. MIM has also provided a structured framework and point of reference to guide the activities of the international scientific community in a more co-ordinated manner. Indeed it has acted as a catalyst for action by scientists and funders, and I'm going to turn specifically to some examples of that in a minute. MIM is in no way attempting to direct scientists, but is trying to respond to priorities that they themselves have identified and to encourage them in their activities. Where possible, MIM aims to add value to efforts to address specific problems, such as drug resistance, by encouraging synergistic activities.

Who are the partner organisations in MIM? There are quite a number and they encompass a range of different types of organisations, each with their individual objectives and remits. It has, however, been extremely encouraging to see how these diverse organisations have worked together under the MIM umbrella. Of course the World Health Organisation and the programme of Roll Back Malaria will play an increasingly important role in coordinating partners within the broader malaria community.

On the communications and publicity aspects of MIM, there have been a number of different approaches adopted. Publicity for MIM, and the general significance of the social and economic impact of malaria in the world today, has been handled very well by the Malaria Foundation International. Meetings, web site information and the MIM Newsletter have also contributed to promoting communication between partners. The communications side is one where our timing was right in terms of opportunities offered by new technology: such technology has changed out of all recognition in the past five

years. Meetings and workshops, where we have personal interactions and informal discussions, are of course extremely important, but today a great deal can be achieved via electronic mail, and of course the world wide web is an increasingly important communicator of scientific and other information.

I want to dwell on electronic communications a little further because the US National Library of Medicine, which is part of the US National Institutes of Health, has been leading an effort to improve the access of African scientists to electronic communication facilities. I think all of our lives have been changed in the last few years by the way we use e-mail to facilitate friendly chat and scientific correspondence, but most importantly to circulate documents and scientific papers plus analyses of particular results or events. This transformation has had a dramatic impact on the international scientific community and is beginning to have an extremely important impact in Africa itself. The world wide web is an extremely important educational tool even at the cutting edge of research. For example the accessibility of databases via this route greatly facilitates international research. The database of the falciparum genome project, or perhaps databases linking global patterns of rainfall to the occurrence of mosquito vectors of malaria are good examples in the malaria research field. MIM of course has not been responsible for the technology, but it has been responsible, via its collaborators, in providing much greater access. An important start has been made in the context of providing greater access to African scientists to the web and electronic communication, but as many of you in the room will know, much remains to be done in this area. I am certain that this one single aspect, namely effective communication, can do more than most other things to promote taking malaria research findings into public health practice, and equally encouraging the growth of biomedical research in Africa.

Regarding support for malaria research, the figure in 1994/95 was about $85 million internationally, a very small amount in relation to the global burden of morbidity and mortality imposed by the disease. There are as yet no up-to-date figures for this year, but it is clear that there has been a considerable enhancement by a variety of agencies. The estimated commitment is currently well over $100 million per annum. Indeed there are a variety of encouraging trends and further increases may soon be announced. Again, MIM has been a part of that process. Some of these things would have taken place of course without MIM, but the Initiative has helped to augment and stimulate certain agencies to contribute more to malaria research.

In terms of promoting global collaborations, MIM has provided unprecedented opportunities for interactions amongst African scientists, and there has also been good progress in promoting communication between Africa and the rest of the global research community. Similarly, there has been a remarkable level of communication amongst funding agencies. There is room for further progress, however, in promoting collaborations and communications between industry and the other parts of the malaria community. In taking this initiative forward in the coming years, I do hope that those of you who are industrial representatives here, can persuade your boards and your senior scientists to play a larger role in the activities of MIM. You are a most important contributor to taking research into practice via the development and promotion of products, whether these be impregnated bednets or new drugs, and indeed hopefully in the longer term, vaccines. There is also scope for further strengthening of links between the biomedical research and public health control communities; an area where the current

Conference aims to make a significant contribution. It is often the case that new findings on the treatment of severe malaria or on the relative effectiveness of different control options take a long time to get from the pages of major scientific and medical journals to the community suffering from endemic disease.

Multi-centre studies and networks, as I mentioned earlier, are important for maximising the impact of activities across Africa and a whole variety of them have been established or strengthened since the creation of MIM. Again, MIM has not necessarily been responsible for all of these, but it has added to their impetus and in very real ways contributed to financial support for a variety of these. One example is the Severe Malaria in African Children Network, which links five sites across Africa for the evaluation of novel malaria treatments and for the development of new interventions. Another example is the East African Network for Monitoring Antimalarial Treatment Efficacy (EANMAT) which was established for standardised assessment of drug resistance at different locations in the East African region, bringing together both scientists and ministry of health representatives. The establishment of the MIM/TDR[1] Task Force for Malaria Research Capability Strengthening in Africa has been a significant development in providing a mechanism to facilitate linkages across Africa and to promote research training and capacity building. The Mapping Malaria Risk in Africa (MARA) project is one important programme that has received funding via this scheme.

I want to now turn briefly to some specific research activities, an area in which I personally feel much more comfortable with. Again, MIM has not been the key component of the research process, as it were, but it has been a very important supporter of a variety of activities. In the area of immunology and vaccine development, support has been provided by NIAID for studies of human immune response to malaria in endemic regions, and the NIAID malaria vaccine development unit has also been expanded for activities such as the production and evaluation of clinical grade immunogens. In the European context, a Malaria Vaccine Research and Development Network has been supported by the European Commission; as has a very important centre, the biomedical primate research centre, which of course we all dearly hope will be the site for future studies on potential vaccines. Importantly, in direct response to the need identified in Dakar, NIAID has established a repository of well-characterised malaria research reagents, such as parasite strains and monoclonal antibodies.

If we look back over the past few years, the malaria research community has been very active indeed. Malaria publications have appeared in the leading scientific journals, such as Science and Nature and in the leading medical journals, such as the New England Journal of Medicine and the Lancet and so forth. And so the community itself has had a very high presence, and it is without doubt an extremely exciting time research wise. There are extraordinary opportunities at the moment and what is required is more individuals contributing to this from African and other developing countries.

It is always dangerous to choose a set of research fields to mention specifically, and indeed I cannot do justice in a very short period of time to the whole range of exciting advances that have occurred recently. I do, however, want to mention a few areas, and you will hear

[1] TDR: UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases

about many others in the specialist meetings within this Conference. The *falciparum* genome project is of course undoubtedly an extraordinary opportunity and one that is progressing extremely well, and I will turn to the details of that in a minute. There have also been very important advances in immunology and pathogenesis, and particularly in our understanding of the causes of severe malaria. Quite surprisingly, there has been significant progress in our epidemiological understanding of malaria disease, even though many of us would have thought malaria epidemiology was a subject that had been worked to death. Particular progress has come from the results of very long-term observation of communities, and important information has been generated on the relationship between exposure to malaria and disease severity; a key factor in interpreting the likely success of different interventions. Another important development is in the process of evaluating intervention studies. We now have a range of methodologies and approaches for looking at cost benefit analysis in a much more rigorous and quantitative manner, where economics, quantitative tools and epidemiology merge together to try to assess what is the most cost-effective intervention in a particular setting.

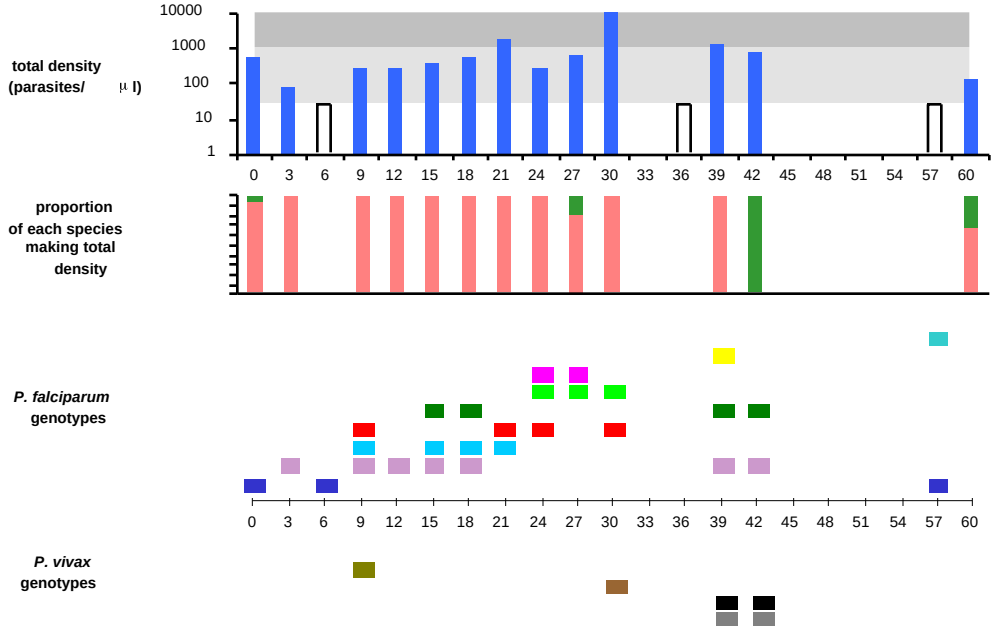
An important clinical development has been the drive to use combination therapy in the treatment of malaria, which was brought to the attention of the broader malaria community at a MIM meeting held in May 1998, and has been very much supported by MIM. To many in the broader infectious disease community, it is somewhat of a surprise that it has taken malaria researchers so long to get to this stage, given the extraordinary successes of combination therapies in the treatment of tuberculosis and indeed more recently, of HIV. One of the key problems in all of these cases is the evolution of the infectious organism under intense selective pressure, and hence the need to vary the selective pressure, for example through the use of drug combinations. Very exciting developments have taken place over the past two years in this field, in which Professor Nick White has been very influential.

I am going to choose just one or two research advances, which are very important for a whole variety of reasons. They are, however, primarily selected because of my familiarity with them, and there are many others that I am less familiar with that are of undoubted equal importance. I would like to mention a study carried out by Karen Day's group, which is not in Africa, but in Papua New Guinea. Particularly important features of this study are its extremely long-term nature and its interdisciplinary character, involving molecular biology, clinical studies and field epidemiology. The research involved longitudinal study of individuals to assess their exposure to parasites over a long period of time, and this is a type of study that the Pasteur Institute in France has also actively supported in Western Africa. Understanding exposure of the immune system to different antigens is crucial to vaccine development in the future. We have had some disappointments in vaccine development in recent years and many believe that this is in part due to our lack of understanding of the complex genetic structure of populations of malaria parasites. If we take some illustrative results from a single patient, a male child aged 10 years, in the study by Marion Bruce, Karen Day and others, the slide (Figure 1) shows total parasite density at the top over time, followed by the proportion of infections that are *Plasmodium falciparum and P. vivax* . Most importantly, the lower graph records temporal changes in the patient of the densities of different *P. falciparum* genotypes as defined by two locuses of MSP2. These results demonstrate that individual children are repeatedly exposed to a heterogeneous parasite population as they age. One of the problems in developing vaccines, therefore, is that the parasite population is not static, it is constantly changing in

its genetic and most particularly its antigenic composition. Indeed, because of recombination, which occurs at moderate frequencies in high intensity transmission areas, developing a vaccine for malaria (or HIV), is an issue of trying to keep ahead of parasite evolution. One strategy, is to seek conserved regions of the genome which elicit protective immune responses. This is not an easy task, however, since the parasite via evolution and selection has acquired mechanisms for generating antigenic diversity in those parts of the genome which are presented to the human immune system, and this is a very common strategy among successful infectious agents. The task of understanding parasite evolution and the constantly changing genetic structure of malarial parasite populations is very challenging and will involve molecular epidemiological studies on a scale many orders of magnitude larger that past studies.

Figure 1 - *P. falciparum* genotyping: Size and sequence polymorphism at the *Msp2* locus
(Bruce *et al*, 1999)

Child 31: Male, age 10

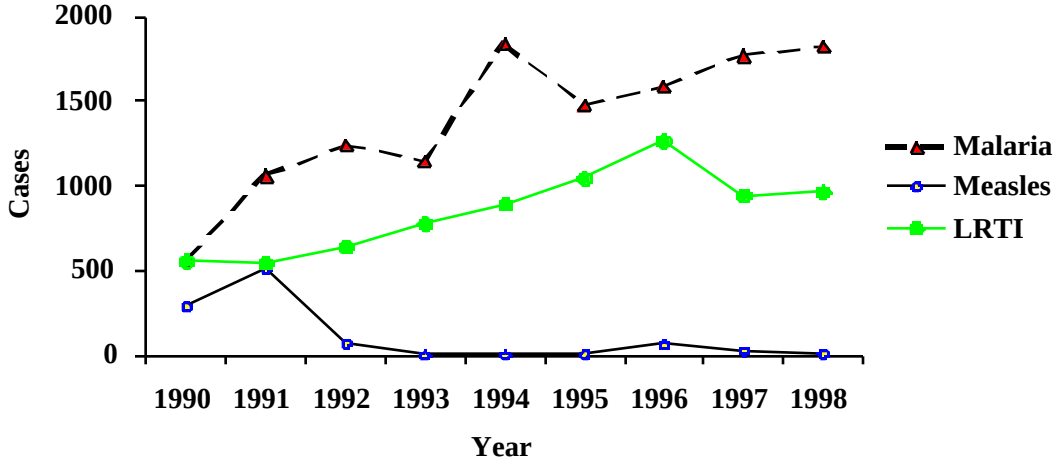


I now want to move on to mention the cross-sectional and longitudinal studies of Kevin Marsh and Bob Snow in the Kilifi area in Kenya. A particular feature of these studies, which I feel is extremely important, is the detailed demographic study of villages over a long period of time. You cannot hope to interpret the epidemiology of malaria unless you understand something of the demography and movements of people. This study combines a whole variety of different skills: clinical, demographic, epidemiological, vector control, and indeed more recently, economic approaches. It is always important to bear in mind that the problem of malaria control is not a static entity. The world population this year is due to exceed the six billion mark and virtually all of that population growth is in the less developed regions of the world. If we look at its distribution between Africa and other regions, the dominant part of the population growth will occur in India first, China second, and Southeast Asia third. Africa, particularly Nigeria as an example, will also make a very significant contribution to net global population growth. So our problem with any infectious agent, whether this be dengue, measles, malaria or whatever, is that the intensity

of transmission is often intimately linked with the density of the human species. The problem of increased population size is going to add to our difficulties in controlling malaria and we therefore have to understand the demographic aspects of the disease, as well increasing our understanding of epidemiology and the treatment of disease.

Records from the Kilifi district hospital (displayed in Figure 2) reveal changes over time in three infectious diseases: malaria, measles and lower respiratory tract infections; the latter of course representing a mixture of infectious agents. The impact of measles immunisation is evident in 1991, but there is a steady rise in respiratory diseases and malaria. This slide illustrates the value of longitudinal studies in close cooperation with African partners and funding organisations, which provide a very important long-term infrastructure for the investigation of both clinical and epidemiological issues.

Figure 2: Malaria, LRTI and Measles patients admitted to Kilifi District Hospital
(Marsh *et al*, 1998)



It might be argued that the rise in the number of cases is due to enhanced reporting or increased attendance at hospital, resulting from the presence of the malaria research centre in the region. The importance of quality longitudinal data, however, is that it enables you to pose very specific scientific questions about epidemiology and the impact of control measures. For example, the association between the incidence of malaria cases and rainfall can be tested. The use of technology such as satellite remote sensing can be used to analyze the association between physical and climatic factors and the spatial distribution of disease. This approach has been used extremely successfully in the field of trypanosomiasis to map tsetse fly distributions and associated vegetation and climatic variables, and is beginning to be used extensively in the malaria field. The application of new technologies to examine associations between disease incidence, climatic conditions and geographical information will, I believe, play an important role in future surveillance and epidemiological investigation.

Of course the practical end of malaria research is trying to make an impact on community health. The work of Vicky Marsh and Bob Snow provides one particular example of an

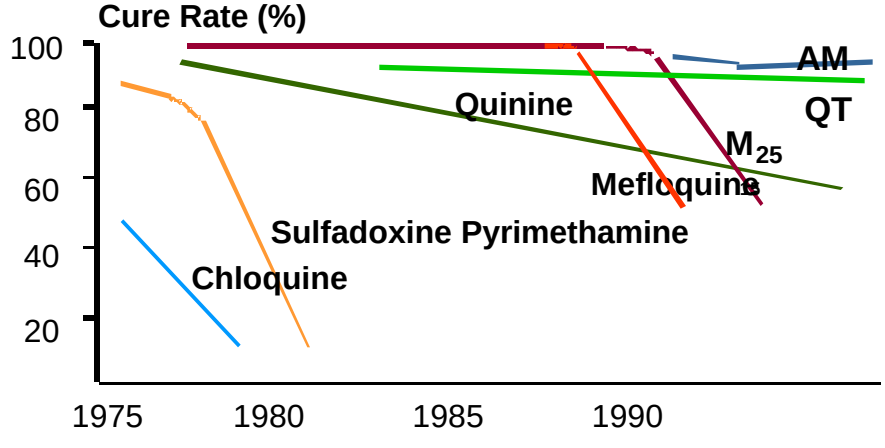
attempt to improve on the early treatment of malaria through education of shopkeepers. Lateral thinking was involved here in trying to decide how best you get research understanding into practice: shopkeepers who may potentially distribute anti-malarial tablets represent a wonderful target for education. Much more of this sort of innovative research is needed.

Emerging resistance to current antimalarial drugs remains one of our greatest problems and a significant component of this Conference will be devoted to this issue. A MIM meeting on this subject was held in May 1998 and perhaps one of the most important outcomes was a commitment from a number of agencies to support safety and efficacy studies on combinations of artemisinin derivatives with other antimalarial drugs. This work is progressing rapidly, and it represents a very important development in trying to use a scientific approach to manage the evolution of drug resistance; and MIM has been important in this process.

The focus of MIM has been on Africa, where malaria has its greatest impact, but it is important to recognise that malaria is also a significant problem in Southeast Asia, India and indeed South America. Hence, I believe that in the future, MIM should perhaps consider extending its activities to these other regions of the world with acute malarial problems. The Wellcome Trust has for a long time supported studies on the evolution of drug resistance in Southeast Asia directed by Nick White in partnership with staff at Mahidol Univeristy in Bangkok. This is a further example of long term commitment to research in partnership with the government of a malaria endemic country. It has provided unique information on the development of drug resistance. The cure rate for patients attending at a hospital in Thailand was studied for various drugs over a period of time (Figure 3).

Figure 3: Resistance in Thailand 1976 – 1998

(White *et al*, 1998)

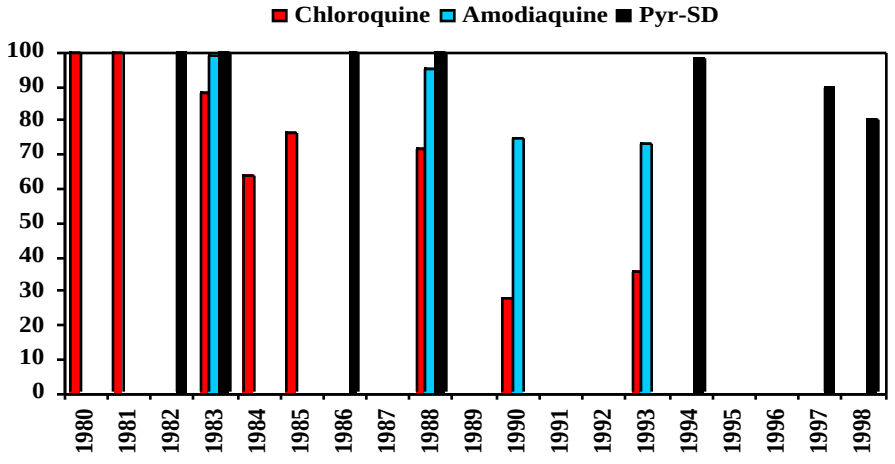


Chloroquine was the first to exhibit the rapid evolution of resistance, followed even more rapidly by sulphadoxine-pyrimethamine. These sorts of long term longitudinal studies provide a lot of information about the mechanisms of evolution of resistance. Another example from Bill Watkins and colleagues studies in Nairobi showing a dramatic fall in sensitivity to chloroquine, but again the important feature is the longitudinal nature of the study (Figure 4). Longitudinal data based on good sampling and reliable tests is an important beginning in mapping the evolution and persistence of drug resistance.

However, to better understand the relationship between the frequency of resistance and the intensity of the selective pressure (i.e. volume of drug consumption) we also need to encourage governments to put in place surveillance of drug consumption patterns and how these change over time and in different locations.

Figure 4: Antimalarial drug sensitivity at the Kenyan coast 1980 – 1998

Watkins *et al,* 1998



We have to go further than this though. Technology offers extraordinary opportunities here: scientific advances have provided us with molecular probes, such as DNA probes, to type very quickly in laboratory or field settings, the presence and frequency of resistant organisms. I would, however, make a particular appeal to the clinical and drug resistance community, that you cannot truly understand these patterns if you only measure one part of the equation, namely, the frequency of resistance in patients. Standard evolutionary theory tells us that the speed of the evolution of resistance is a function not only of the mechanism by which resistance is conferred, but also of the intensity of the selective pressure, or the level of drug use. We know very well from the antibiotics field, that if you can record and quantify drug use it can give you important insights into whether there is a critical level of use where you switch into high levels of resistance frequency and so forth. So in the malaria field we need to move forward to understand patterns of drug use in a quantitative, longitudinal sense.

Studies of the prevalence of malaria infection in relation to the intensity of transmission has recently revealed some important findings. As we move into more intensive intervention studies, whether by bednets or other means, we have to understand the relationship of severe disease to transmission intensity in much finer focus. Work by Snow and colleagues has generated some significant data on the age-specific incidence of serious disease. In view of the focus of disease in the younger age groups, it is evident that any intervention will shift this pattern of age dependent disease. Generally in infectious disease epidemiology, reducing the intensity of transmission raises the average age at infection. Quite subtle quantitative calculations need to be done on the intensity of intervention required not to shift this serious burden of morbidity into older age classes, but instead to reduce it significantly. The progress in our understanding of the relationship between serious disease and exposure has been important, and one that MIM has encouraged.

Finally, the malaria genome mapping and sequencing project is a wonderful scientific advance, which is progressing extremely well at present. For maximal efficiency, the 14 falciparum chromosomes have been divided up between sequencing centres in the United

Kingdom and the USA, supported by various funding agencies. The project is an excellent example of a collaborative, co-ordinated approach by both scientists and funders to achieve a large-scale scientific objective. There has been astonishing progress: Chromosome 2 is already finished, Chromosome 3 is almost complete, and there is closure on Chromosomes 1 and 4. The project is likely to be completed ahead of schedule. It really does offer the most extraordinary opportunity for understanding a whole variety of key scientific issues. Completion of sequencing is of course only the beginning, and there are further important stages to exploit this information. Firstly, understanding what genes do and whether they offer sensible targets to modify or block the specific gene product to the detriment of the parasite; and then secondly, assessing malaria diversity. Genetic diversity is key to understanding a wide variety of problems including vaccine development, drug resistance and pathogenicity. The genome projects, undoubtedly will move more into diversity studies in the coming years, as most of the important human pathogens are sequenced.

Finally, I would like to refer to the current MIM Conference. There is an exciting programme in store, and it is an exciting time to be a biomedical scientist. There are many scientific opportunities, but our real challenge, which will be addressed by David Nabarro, is to turn these exciting opportunities into practice, and to make a difference in the fight against disease. That is something that we have failed to do in the past in a number of infectious disease fields, HIV being a very dramatic example, and we must not fail against malaria.

To end on the point I started with, the Wellcome Trust thanks the community for its tremendous support and all our partners, who we have greatly enjoyed working with. The role of MIM co-ordinator will soon be rotating onto another agency and we wish our successor great success in taking the Initiative forward in the coming year. My own impression of MIM is that it has made a good start, there have been some very specific things that have been achieved by MIM, but there is a lot of hard work to do as yet. Promoting effective communication is of very particular importance.

The MIM/TDR Task Force on Malaria Research Capability Strengthening in Africa

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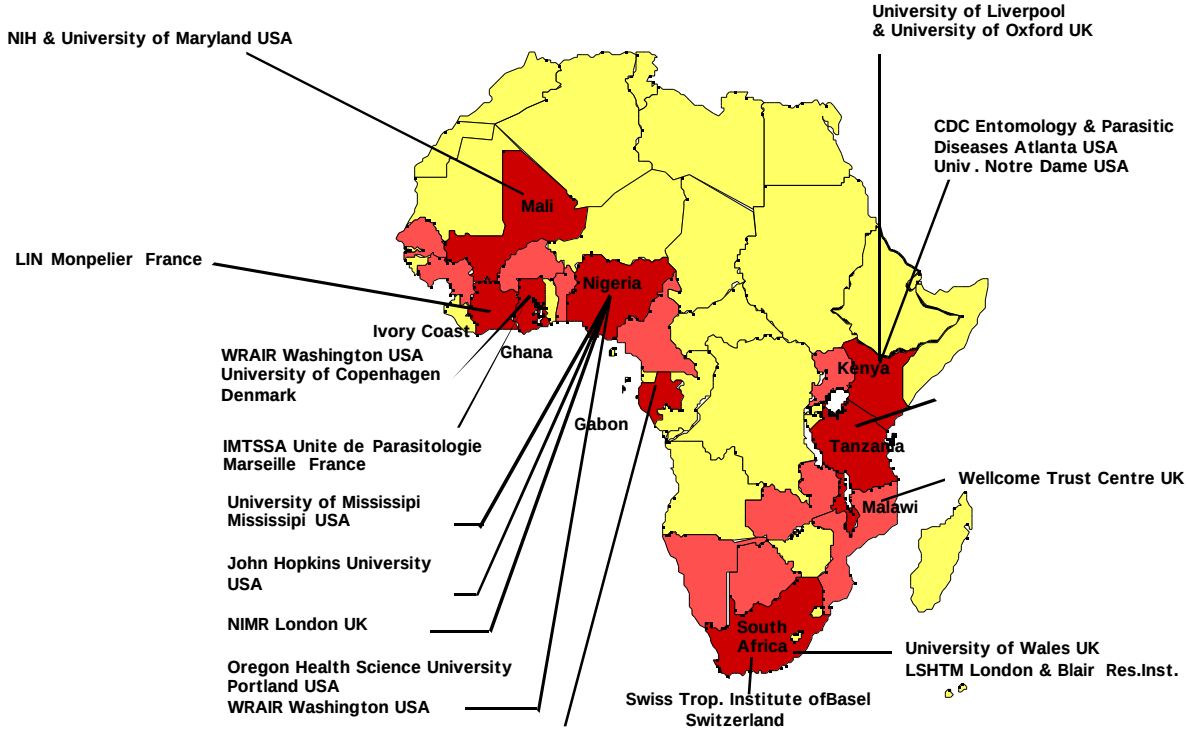
It is a honor to present an overview on the Multilateral Initiative on Malaria in Africa (MIM/TDR) Task Force for Malaria Research Capability Strengthening in Africa at this historical Conference. I am sure that everyone here has seen the lists of the projects that have been funded through this initiative. What I would like to do in the time allotted is to talk about the rationale behind this effort to build capacity for malaria research and control in Africa, and to highlight the philosophy that serves as the driving force for those who are supporting the initiative. I hope that the principle behind the initiative will become clear and receive the necessary support from African scientists, and at the same time provide a strong rationale for the funding agencies and the international community to continue to provide financial support and expertise for the initiative.



We have listened in the past thirty minutes to all the achievements in science and technology that have accrued over the last ten years and the results of the efforts by MIM in promoting utilization of some of the achievement in efforts against malaria in Africa. The potential contributions of impregnated bednets, the new anti-malarial drugs that are in the field, and the genome project that promises advances in terms of new drugs and vaccine developments have been presented with great hope for control of malaria.

The question that comes to mind after the presentations is, if all these facilities and advancements are available, why do we need capacity for malaria research in Africa and why are we still subjected to the problem of one million children dying from malaria in Africa? The current situation in Africa is a simple one: all of these facilities require human resources, well-trained scientists, investigators and control managers who understand how to adapt and implement these facilities for controlling malaria. If you have insecticide

treated bednets available in Africa today, would those involved in malaria control at the ministry of health identify the appropriate population and community where it should be implemented for maximum benefit? Antimalarial drugs derived from the Chinese herb Artimisinin are now available and studies by Professor Nick White and the other investigators have shown that these drugs should not be used alone because of the danger of selection and dissemination of resistant strains of the malaria parasites. How many of our investigators in Africa and those charged with the policy making or implementing control programmes are aware of the need to use this drug in combination with other antimalarial drugs in order to prolong clinical life of this valuable drug?

These underscore the lack of critical mass of investigators, control managers and infrastructures that are necessary to monitor post deployment of these instruments, so that we do not end up with a DDT story, which will be demonstrated by rapid generation of resistance to new anti-malarial drugs and insecticides. We are all quite aware of the unfortunate financial situations of our governments in Africa. There is no single government beside the Southern African corner that has sufficient funding allocation to malarial control programmes in Africa. Funding for most research activities come from the Northern partners; often through collaborations between Northern investigators and resident African investigators, who are few. In order to better utilize tools against malaria there is a need for access to technologies that are often unavailable in Africa. However, the extent of interaction between investigators in Africa and those of the North is often limited, with the exception of those who trained in Northern facilities and retain their umbilical cord with the supervisors. More importantly, African countries lack opportunities for collaboration with each other. For example, communication between Nigeria and Cameroon is non-existent and discussions between a researcher in Southern Nigeria and someone in Mali requires 24 hours of travel to Bamako in order to plan or implement anything that would be productive.

These are major reasons why MIM focuses on seeking solutions that would be useful in terms of making better utilisation of the new technologies available to Africa. The philosophy is to develop a unique strategy that takes into consideration existing facilities and competence that is currently available in Africa, with the aim to enhance and efficiently utilise these limited resources and the support of the international community. It was also noted that implementation of this unique strategy must be based on a philosophy that every stake holder can appreciate and support. There is no looking for new funding for new structures. Instead we need to build upon existing strengths to promote productive utilization of the technologies that can be transferred and adapted from the developed countries. This requires using the strengths of the ministries of health, and of government universities that are responsible for training training young scientists, and building on the interests, support and expertise of Northern partners to transfer technology to Africa in promoting effective control of this devastating disease.

In order to accomplish this objectives, the Multilateral Initiative on Malaria in Africa (MIM) charged the UNDP/World Bank/World health organization Special programme on tropical Diseases Research and Training (TDR) with the challenge of bringing together stake holders with interest in supporting capacity building research and control of malaria in Africa. TDR as a Special Programme at WHO spent the last 25 years on training and research capacity building in tropical diseases research all over the world. This training programme has had many successes. A significant number of those attending this

Conference have benefited from TDR programmes. In order to accomplish this objective, TDR focused on putting together a Task Force of international experts with a unique approach on the composition of the members. The MIM/TDR Task Force was designed to be made up of at least 50% African scientists. The question that one may ask is why 50% African scientists? Well, we have the experts and technological know-how in the North, but knowledge of the socio-cultural situation that is necessary for successful implementation of this expertise in Africa communities, resides in the African population. The African experts that are aware of the problems often do not have the opportunity to access and interact with experts of the North to promote effective utilisation of tools. It is in this respect that the composition of the Task Force becomes an important factor in the success of the initiative.

Let us for example examine an anecdotal situation with a study in India that aimed to assess the effects of introducing impregnated bednets. The community that was chosen for the study was a small village, and after studies in the area, it was observed that there was apparently no effect - until a member of the ministry of health pointed out to the researchers that most of the population worked at night and therefore did not benefit from the bednets. These are situations that you also find in Africa communities that may not be apparent to investigators. Introduction of artemether or artesunate suppositories in Africa will require an understanding of the cultural predilection not to accept administration of drugs via a route that is generally taboo in African communities. To convince a mother that drugs that are usually administered by mouth or by injection now have to go through the opposite end of the child requires contributions on detailed understanding of the sociocultural factors which can be provided by those working within African communities.

This underscores the rationale for ensuring Africa's involvement in the MIM/TDR Task Force. The Task Force at its inception insisted that its programme must be different, and should not be equivalent to research projects funded through other international funding programmes. How do you obtain such uniqueness in an environment that is saturated with many success stories and with brilliant programmes that have been well-crafted by different agencies? This led to a search and much discussion on how to implement the unique strategy criteria outlined by the group.

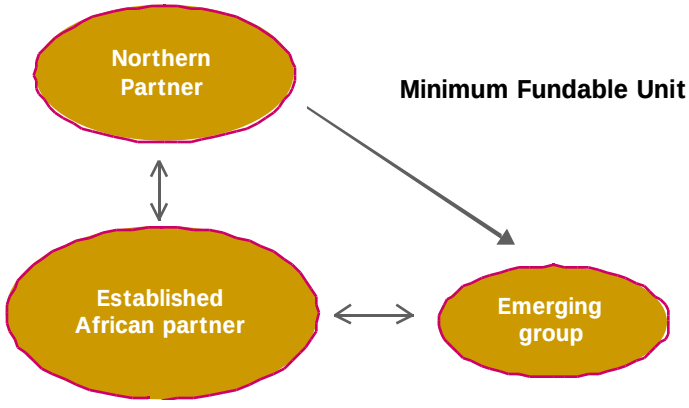
The first of the criteria that was agreed upon is to ensure that there is a congregation before building a cathedral. In the past, laboratories were often built before training investigators to utilize the facilities. The development of human resources must precede provision of infrastructure, and infrastructure must meet the needs and conditions available in Africa. Later, the human resources built up in one location can be used to enhance the development of other institutions. For example, training in Mali for investigators from the Benin Republic and opportunities for young scientists from Congo to train at the MRC in South Africa, and similarly for students the Niger Republic to undertake PhD degree studies at Ibadan, Nigeria represent effective utilization of the limited resources in Africa.. Availability of infrastructure and a critical mass of investigators at each institution can thus be used to promote group linkages. Promotion of interactions between research or control groups in Somalia, Ethiopia and Kenya, with the opportunity for investigators and control managers to discuss indiginous problems and provide indiginous data necessary for policy making in this context represents a prerequisite for a successful malaria control initiative in Africa.

It is apparent from the programme of lectures and activities scheduled for this Conference that the list of African investigators participating as leaders of research or control groups is short. It is not that they do not exist, but they are few and far between. To address this, the programme proposed by the MIM/TDR Task Force provides the opportunity for training African leaders. It is not enough to train workers to collect data or samples for malaria research or control. We need opportunities for African investigators to be in positions to determine the priority and focus for research and control in their immediate communities. There is a need for opportunities to train programme managers who can translate the findings of of both local and international research and inform decision makers of the potential value of utilising indiginous data in evidence based policy making and implementation.

Today there is to a large extent a blanket approach in terms of management of malaria in Africa. A single drug recommendation is used across the continent and a switch from the first choice of anti-malarial drug is based *a priori* on factors that are irrelevant to the parasite population and irrelevant to the effectiveness of the drug in specific patient populations or demography of the community. Instead, it focuses more on the ability to pay, or if the budget of a country is sufficient to sustain the change. A critical number of trained local leadership and expertise in science and control, provides valuable opportunity for appropiate determination and policy choices based on unique and peculiar factors in the population without extrapolating directives for Nigeria from data obtained in Ifakara. These indigenous experts can then advise their governments on the procedures that should be involved in policy making, based on uniqueness and peculiarity of the community. In addition, it is clear that a well trained investigator in Nigeria can co-operate and collaborate with investigators from Oxford and London exchanging views on local factors that can enhance the potential successes and drawbacks of applying new technology developed in their laboratories. Today a large number of models that have been applied for malaria control and research in most of the African countries are based on wholesale importation without relevance to what is available and what should be considered in the communities, and this has led to limited success. With this in mind, the MIM/TDR Task Force decided that it had to look for uniqueness in its programme, and should ensure that the underlying philosophy must be made known to all those participating.

What are the characteristics of the programme that the Task Force came up with that differentiates it from the current standard of practice in grants and programmes? The minimum fundable unit is one unique aspect. The Task Force proposed that each project should involve at least three entities, consisting of a non-African partner from any place in the world. So far, the non-African partners are mostly from Europe and the United States of America, but we are also hoping for involvement of partners from Southeast Asia, South America and Australia. The unit must also include an African institution that has enough scientists or control experts trained at one level or the other, but which does not have the infrastructure or equipment essential for promoting the excellence that is desired for successful contributions to malaria control or research. Finally, the unit must include an emerging African institution that has only a few scientists or control experts, but is interested in contributing to the effort against malaria by developing a critical mass. The hope is that the non-African partner will contribute in efforts to transfer the needed technology and continue to contribute to training of the African partners at the established institution and at the emerging institution. The Task Force provides funding for

the infrastructure and equipment needed by the established institution, so that it can effectively utilize and incorporate the new technology transferred from the North.



What else is unique? The principal investigator representing the three partner institutions must be an African working and resident in Africa, because leadership can only be learnt through practice. The intention is that leadership can be acquired by practicing with a Northern partner who has experience in such leadership. The principal investigator in effect is not only leading a group, but is also learning how to run projects, how to successfully execute programmes and acquire knowledge of how to source funds to maintain a programme. In addition to this, for the first time in the history of science and research in African, TDR and WHO were permitted to pay salary supplements to the investigators. Why is this important? The economic disadvantages in Africa results in a major problem of 'brain drain'. A large percentage of those trained in Europe and the USA remain there or migrate to the middle east, because they cannot get sufficient financial remuneration in Africa to maintain their family and contribute meaningfully to the research or control process.

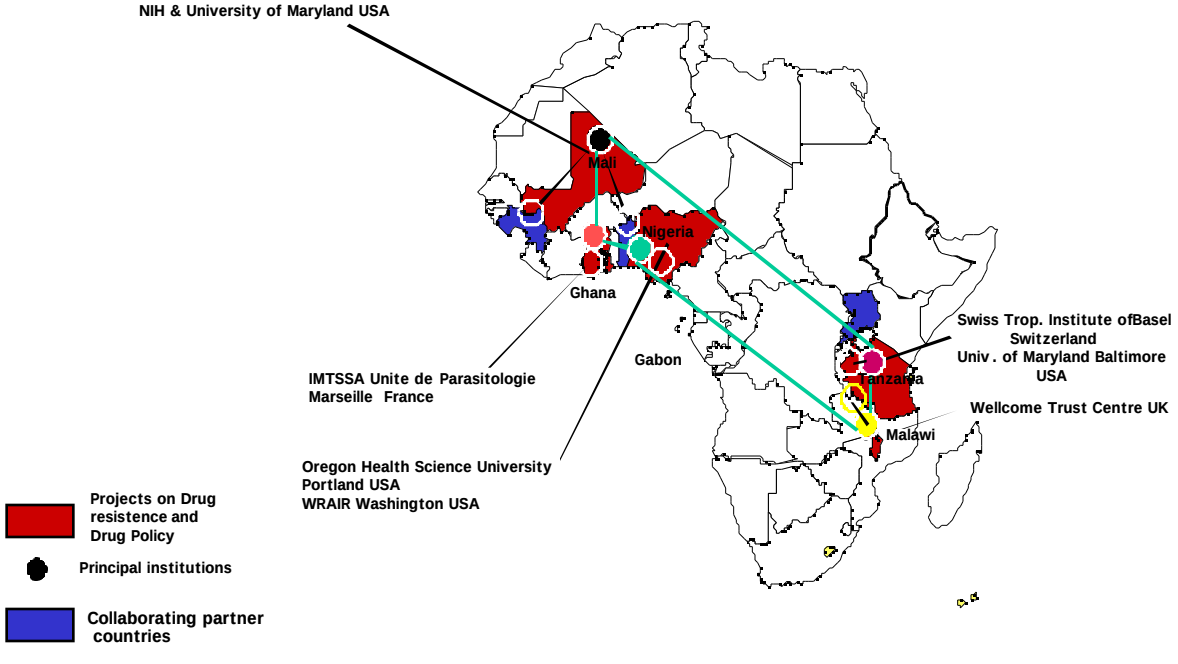
Of great importance, is the emphasis laid on the need for the MIM/TDR programme to be science driven – funds should not be provided just to buy science equipment or support PhD training. In order to achieve this, the Task Force identified a number of research priorities, including anti-malarial drug policies and drug resistance, epidemiology, pathogenesis, vector studies and health systems research including social sciences which we know are essential in utilising new drugs and other interventions for a successful malaria control programme. The location of training for African scientists was also agreed upon: this training must occur primarily in a research environment in Africa, but there is also the opportunity for 3-9 months training overseas. The rationale for stipulation on location of training was predicated on a need for African investigators to keep abreast of local situation and focus their programme of training on relevant problems in Africa. This permits acquisition of knowledge and new expertise without loosing "touch" with the reality of the malaria problem in the community. It also provides the advantages of developing the African institutions while training the new generation of investigators.

The Task Force will support relevant research projects or programmes covering, but not limited to, the following priority areas, including cross-cutting innovative approaches.

- **Antimalarial drug policy and chemotherapy** - development of strategies for rapid mapping of drug resistance; innovative approaches for preventing, retarding and reversing drug resistance; definition of criteria for replacing first

line drugs; identification, selection and evaluation of alternative first and second line chemotherapies (including combinations); and development of new drugs based on phytomedicine.

- **Epidemiology -** the use of new technologies to identify parasite diversity in various settings; the relationship of parasite diversity to immune responses and host resistance; analysis of the relationship between transmission, infection, disease patterns and deaths in order to design effective intervention strategies; development of methodologies to measure the impact of interventions including drugs, bednets and vaccines on disease and parasite diversity; development of new approaches to testing vaccines and drugs in different populations including adults; and development of simple and rapid epidemiology mapping methods.
- **Pathogenesis** - studies on parasite-vector-host factors (including immune responses) iinvolved in severe disease and malaria in pregnancy, with the aim of developing and promoting improved preventive and case-management strategies.
- **Vector studies -** application of newly developed molecular tools for studies on vector biology, feeding behaviour, vectorial capacity, insecticide resistance and population genetics with the aim of identifying and developing effective strategies for vector control in focal, low and high transmission settings; and screening of natural local products for insecticidal and repellant properties.
- **Health systems research including social science** - improvement of the home management of malaria based on community knowledge and practices; development and adaptation of products to enhance the case management of malaria at household level; improvement of collaboration between public and private health providers and the exploration of health sector reforms to enhance malaria control strategies.



In the first competition for awards, 64 applications were evaluated and fifteen were awarded. These fifteen which most of those present here are familiar with, cover a range of research priorities identified by the Task force. One important focus is on drug resistance

and there are now five centres that have been supported (see figure above) that will be building capacity to establish data on the profile of drug utilization in patients, the profile of drug resistance in parasites populations, and the molecular profile that can be correlated with drug resistance. It is hoped that with this network led by African scientists and control managers, the future utilization of antimalarial drugs will be more effective, based on local evidence and data.

I would like at this point to thank those who have contributed to the MIM/TDR fund. The initial fund that was used was contributed by the US National Institutes of Health, WHO/TDR, the Government of Norway, the Rockefeller Foundation, the World Bank, the African Regional Office of WHO (AFRO), the French Ministry of Co-operation, the Division for the Control of Tropical Diseases (CTD) at WHO, the Government of Japan and the Roll Back Malaria Project of WHO. In order to move the agenda forward for building capacity in Africa, what is needed now is not only to support funding agencies to continue their input into the MIM programme, but also for African scientists themselves to understand the philosophy underlying the programme, believe in it, promote it and practice it. I hope we will be able to achieve this.
Thank you.

Post-script

Following the MIM Conference the MIM/TDR Task Force convened to consider a second round of applications and to review progress on projects awarded in the first competition. A total of 106 proposals have been reviewed in the two rounds. Twenty projects have been supported, involving 23 African countries, 7 European countries and the USA. Over 100 research groups are involved in total. The provision of training is an important aspect of the MIM awards and 17 PhD and 11 Masters research Training Grants have been approved in connection with the funded projects.

The successful projects supported by the MIM/TDR Task Force on Malaria Research Capability Strengthening in Africa are listed below and full details can be found at:
http://www.who.int/tdr/diseases/malaria/mimprojects.htm.

ADENIYI, J. - College of Medicine, University of Ibadan, Nigeria - Incorporating socio-cultural/economic characteristics of mothers/care-givers in home management of childhood malaria.

AKOGBETO, MC. - Network to study factors conditioning evolution of

pyrethroid resistance in Anopheles gambiae s.l..- Organisation de Coordination de la Cooperation pour la Lutte contre les Grandes Endemies (OCCGE), Cotonou, Benin

AJAIYEOBA, E. - PIMRAT, University of Ibadan, Nigeria - Identification and clinical evaluation of potential antimalarial components from Nigerian phytomedicine compendium.

AKANMORI, B. - Noguchi Institute, Ghana - Immunopathology of severe anaemia in P. falciparum infected children.

DOUMBO, O. - University of Mali - Surveillance and control of drug resistant malaria.

DOSSOU-YOVO, J. - Institute Pierre Richet, Organisation de CoopTration et de Coordination pour la Lutte contre les Grandes EndTmies (OCCGE), Bouake, Ivory Coast - Influence of environment modification for rice cultivation on malaria transmission and morbidity in rural IVC forests.

HASSANALI, A. - R&D partnership in bioprospecting for antimalarial, mosquito repellent & insecticide plants in East Africa. International Centre of Insect Physiology and Ecology (ICIPE), Nairobi, Kenya.

KOKWARO, G. - University of Nairobi, Kenya - Integrated training/research project on clinical pharmacology of key drugs used to treat and manage P. falciparum malaria.

KORAM, K - Noguchi Institute, Ghana - Mapping response of P. falciparum to chloroquine and other antimalarial drugs in Ghana.

LE SUEUR, D. - National Malaria Research Programme, South Africa - Mapping malaria risk in Africa (MARA).

MACHESO, A. - Community Health Services Unit (CHSU), MOH, Malawi - Optimal antimalarial drug policies in Malawi Ministry of Health. Monitoring and limiting evolution of resistance to widely used drugs.

MSHINDA, H. - National Institute of Medical Research, Ifakara, Tanzania - Molecular epidemiology and modelling the spread of antimalarial drug resistance.

NWAGWU, M. - University of Ibadan, Nigeria - Antibodies that inhibit malaria merozoite surface protein-1 processing and erythrocyte invasion.

SANOGO E - Relation between malaria transmission intensity and clinical malaria, immune response and plasmodic index. Centre National de Lutte Contre le Paludisme (CNLP), Ouagadougou, Burkina Faso

NTOUMI, F. - Centre International de Recherches MTdicales (CIRM), Franceville, Gabon - Relation between complexity of infections, disease, transmission and human red blood polymorphism in two African countries.

OKETCH-RABAH H.A. - Research and development of new botanical antimalarial drugs in East Africa. University of Nairobi, Kenya

OLADEPO, O. - Postgraduate Institute for Medical Research and Training (PIMRAT), College of Medicine, University of Ibadan, Nigeria - Intersectoral model for management, control, and policy formulation on drug resistance.

SHARP, B. - National Malaria Research Programme, South Africa - Development and implementation of molecular and biochemistry capability for insecticide resistance monitoring and management in South Africa.

VULULE, J. - Kenya Medical Research Institute (KEMRI), Kenya - Population structure of *A. gambiae* and *A. funestus* in Kenya and West Africa.

Introducing the Global Partnership to Roll Back Malaria

David Nabarro, Roll Back Malaria, World Health Organisation, Geneva, Switzerland

I will start by examining the global malaria burden, using figures and facts that are familiar to many of you. I will present a brief history of the Roll Back Malaria initiative, describe the principles of the Roll Back Malaria Partnership and summarize the outline 10-year plan of action for Rolling Back Malaria. The partners involved in rolling back malaria include national governments, development agencies, research groups, commercial entities and non-governmental organisations. I will predict ways in which they will work together and criteria that can be used to judge the success of the partnership. I shall end by indicating some of the challenges and issues to be addressed if we are to be successful: I hope we will be able to discuss these during the conference break-away sessions.

The global malaria burden

The first MIM meeting in Dakar highlighted the need for more data on epidemiological patterns of disease and intensifying research in this area. Organisations within MIM networks are providing vital information that's important for the future of efforts to Roll Back Malaria: this represents a strong partnership between the research and the control communities.

For example, recent analysis by groups based at KEMRI, with the involvement of the Wellcome Trust team, particularly Dr Bob Snow, have confirmed that we have strong epidemiological basis for the estimate that at least a million people die from malaria each year. 95% of these deaths are in Africa. When deaths due to epidemic malaria are taken into account the total figure will be greater.

We can also be more precise about the other impacts of malarial disease -- particularly its economic impact. Dr Geoff Sachs and his colleagues at Harvard have reminded us that malaria has its greatest impact on the poor people of the world. If we look at countries' GNP per capita and then compare it loosely with the intensity with which they are affected by malaria, we find that intensity is greatest in the poorest countries in the world.

More recent data also suggests that malaria is a major contributor to continuing poverty. This indicates the contribution of malaria to poverty, the economic consequences of the infection, and the contribution of malaria to overload in health sectors.

More of this kind of work is needed. It is critically important that we all have access to more precise data on the epidemiology of malaria and on its impact on economies and societies. The ranges of the estimates that we have for the malaria burden are very great. Unless we can get more precision on the situation, we will find it hard to obtain a realistic understanding of progress with rolling back malaria.

Political support

The Roll Back Malaria initiative recognises that levels of malaria-related mortality and suffering, particularly among the children of Africa, are increasing, and that this undermines development. It builds on the successes of past control efforts, intensifying the response to a level concomitant with the challenge.

The partnership to Roll Back Malaria has profound political support from the Heads of State in the Organization for African Unity who proposed a new initiative on malaria as early as 1994 and declared an intention to reduce the malaria burden for their people in Harare in 1995. This prompted accelerated efforts to control malaria in Africa from 1995 through to the present, led by WHO's Regional Director for Africa, Dr Ebrahim Samba, and his WHO colleagues. They proposed an African Malaria Initiative in 1997.

Recent progress

When Dr Gro Harlem Brundtland was preparing to run for office as Director General at the World Health Organization in late 1997, African leaders convinced her that a greater international effort to tackle malaria was well overdue. She recognised that this would be no easy task, and decided that a novel approach was essential. She announced the Roll Back Malaria Initiative in January 1998 and started preparatory work in February. The initiative was backed both by the World Health Assembly and the G8 heads of State in 1998[2]. A special "Cabinet" project was set up to take forward the WHO contribution to rolling back malaria in July 1998. In October 1998, Dr Brundtland, James Gustaf Speth (then Administrator of UNDP), James Wolfensohn (President of the World Bank) and Carol Bellamy (Executive Director of UNICEF) committed their organizations to rolling back malaria within the next decade. The institutional commitment is absolute, and means that the partnership will support a movement to Roll Back Malaria at community, national, regional and global levels. The global Roll Back Malaria Partnership was consolidated in December 1998. It comprises at least 40 governments of malaria endemic countries, NGOs, development agencies and research groups. WHO's Roll Back Malaria Cabinet Project serves as the secretariat for this partnership.

The present response to malaria is characterised by fragmented efforts among development partners. MIM is one example of a powerful attempt to establish a more focused and synergistic response in the research community. However, the fragmented approach in the malaria control community favours the parasite and the mosquito: it works against the interests of people at risk. Partners want the Roll Back Malaria initiative to put the primary emphasis on people, and not concentrate on the parasite and the mosquito. In proposing principles to the partnership, we in the WHO project are suggesting that if people at risk have the necessary knowledge about malaria and other communicable diseases they are in a better position to make better choices about their health. The choices that they make in practice are also influenced by the way in which they use the knowledge, the supportiveness of their environment, resources at their disposal and services that are on offer. If people are at the centre of Roll Back Malaria, the movement has a chance of maintaining its momentum.

The partners are approaching malaria differently: they see it not just as a tropical disease, not just as an illness, but as a significant cause of world poverty and suffering. This has already been emphasised by speakers in the conference opening ceremony: malaria is a challenge to human development.

Partnership principles

The Roll Back Malaria movement is characterised by other principles too. It is concerned with partnerships, just like MIM – primarily partnerships at the country and community

[2] The G8 includes Canada, France, Germany, Italy, Japan, Russia, United Kingdom and USA

levels, because countries are the place where the majority of control efforts have to be started. It prioritises malaria
appropriately within the health sector development, bridging the gulf which has grown between thoase committed to individual disease control efforts, and those concerned with investing in improved health services. The response to malaria is more clearly defined with an agreed strategy and clear deliverables that should enable those less familiar with malaria to be in a better position to make programme choices. Countries will be enabled to build up their own technical capacities as appropriate and access consistent technical support that is based on the most recent evidence. There is likely to be a strong involvement of the research community and private sector in the Roll Back Malaria effort, both in action at the country level, and in the kind of networks with which you're involved with in MIM. It is hoped that this approach will be a pathfinder for work on other communicable diseases.

Strategy

The Roll Back Malaria strategy has two clear aims: the first to ensure that the existing techniques and interventions to tackle malaria are more effectively used; the second to make sure that new, cost-effective products and interventions are made available. It is based on the Global Malaria Control Strategy, agreed in Amsterdam in 1992. If taken to scale, existing interventions could achieve much better results. In some situations, particularly areas of high *plasmodium falciparum* transmission, significant gains will depend on cost effective new products and tools. A malaria vaccine is needed, and there are promising candidates, though much more research is needed to bring them into use within the next 10 years. New combination drugs, such as artemisinin derivatives, will be essential to reduce mortality and combat drug resistance. More anti-malarial products are needed, at an affordable price, given the capacity of the parasite to resist so many of those which are currently available.

The strategy will be presented in a simplified form: the prototype is in the circular booklet that is being made available to conference delegates for their comments. There are several principles that underlie the strategy: first - Roll Back Malaria is about choosing the appropriate response to local needs. There is no single approach to malaria that is applicable everywhere. Second, that Roll Back Malaria as a global movement that catalyses local initiatives. It is built up on the capacity and ideas that are expressed by communities and countries. It involves local partnerships and local initiatives working towards common goals. It is not a global movement with a global blueprint.

There are six elements to the strategy: six elements to what we all do if we're involved in malaria work. We are now trying to capture these in a short form which will enable a wider understanding of the strategy: I present the first attempt to do this now, as we would like help from the research community to develop it further. The essential elements include **evidence-based decisions, with an emphasis on prompt detection and early treatment, multiple approaches to prevention, effectively coordinated action (within the context of a stronger health sector) and a dynamic global movement.**

Examples of **evidence-based decision making** include

- better surveillance of malaria in populations (using patient and community studies as well as climate-related GIS studies) to detect and respond to areas and populations most at risk;

- monitoring of the malaria parasite's resistance to anti-malarials, so as to establish the most appropriate policies for drug therapy, and
- communities having reliable information about malaria so that they can make choices about how to respond that safeguard their health.

The need for **prompt diagnosis and rapid treatment** is well recognised among malaria professionals. The strategy recognises that

- home is the first hospital – giventhe speed at which malaria kills, it's vital to have the medicines and interventions available within or close to the home, especially for children.
- treatment for severe malaria needs to be to close to where the people live rather than many hours' travel time away. This may mean ensuring that local healers and private practitioners are better able to respond to malaria, and
- effective referral services for the severely ill at local hospitals are essential, if lives are to be saved.

We need to encourage the selection of the best **combination of approaches to prevention** . For example, researchers in this room have shown that in some settings, particularly where transmission is intense, bednets and other materials treated with insecticides can yield incredible results. They can reduce childhood malaria deaths by at least 20%, perhaps even by 25% or 30%. Other methods include the spraying of safe insecticides onto house walls (especially important in situations of epidemic malaria), the location of home, animals sleeping close to the house as decoys, and mosquito coils. Communities that are well planned with good environmental management limit mosquito breeding. Multiple approaches to prevention are key.

The partnership will need to support **strategic research** to develop new treatments, vaccines and insecticides, through imaginative new ventures that encourage greater involvement of industry, and co-ordinated efforts to develop a malaria vaccine.

Action to roll back malaria has to be coordinated . The strategy recognises three components to this action: community action, health sector development, and the involvement of other sectors of government in getting results: sectors concerned with education, industry, agriculture and the environment.

A **dynamic and effective movement** , involving a coalition of stakeholders working in partnership, is the only way to take forward action to roll back malaria. Stakeholders include national governments, commercial entities, foundations and trusts, non-governmental organizations, civil-society associations and media, research and academic institutions, UN organisations, development banks, bilateral development agencies, NGOs and civil society. Action is most effective if they are able to work together in partnership, and national governments should lead these partnerships. The World Health Organization will offer technical support. Such partnerships are likely to emerge in malaria-affected countries over the next several years.

Taking forward action to Roll Back malaria

The objective is to halve the global malaria burden over the next ten years through a mixture of interventions adapted to local needs made available through community level action and supported by more effective health care systems. This will be achieved through

intensified action at community level, supported within countries by the partners working together. They will adopt harmonized strategies and ensure consistent approaches to capacity building and addressing technical issues. Partners will also undertake intensive investment in better control tools.

Inception of country-level action to roll back malaria involves national governments and outside agencies working together to establish partnerships that are collectively committed to RBM action. During the first year partners will reach agreement on ways to work together that respect the comparative advantage of each, and involve working together in a flexible manner towards common goals using agreed strategies and procedures. We expect to see Roll Back Malaria action incorporated into a wide range of health sector and inter-sectoral initiatives. We hope it will be possible to institutionalise the partnership procedures within countries as soon as possible, while adopting flexible approaches to catalysing community-wide movements. We expect to see a range of imaginative and novel approaches taken forward through the efforts to committed advocates who are not normally involved in health action.

Already the World Bank, UNICEF, and bilateral donors are working with a number of governments in Africa to establish partnerships. Key officials within government and development agency offices are teaming up together to help catalyse national RBM movements. During the remainder of 1999, WHO country, regional, headquarters offices will be heavily involved in initiating this action. This will mean working with partners to establish the current situation, agree intentions for RBM at country level, initiate advocacy, and set up systems for monitoring progress. WHO will provide specific support to country partnerships - trying to broker technical and financial assistance, endorsing the technical content of strategies based on the best practice, encouraging partners to stick to their agreements and monitoring progress within the context of wider health sector development.

The Global Partnership will meet regularly (twice yearly at first) to focus on country-level needs and the needs for investing in research and product development. This means a particular focus on what's happening at the country level, and intense efforts to achieve a significant increase in resources. The partnership met for the first time in Geneva during December 1998. Within WHO, we plan a single WHO-wide strategy for rolling back malaria, with partners eventually subscribing to this strategy to ensure harmony and consistency. Roll Back Malaria will support a number of technical support networks based on WHO regional offices, and involving personnel from other development agencies as relevant. One example is the technical support network on insecticide treated materials which will be handled by UNICEF, with strong sponsorship and support from WHO.

Support networks to develop capacity for rolling back malaria

The WHO Roll Back Malaria Project will draw on capacity throughout WHO at all levels: we hope that within a few months, WHO county representatives, regional office personnel, and personnel from headquarter departments offer the same core information and approach to rolling back malaria. We expect the technical support networks to build on existing efforts of the research and consulting communities - the kind of areas that MIM has taken as its priorities. This means technical support for

Increasing the use of insecticide treated materials,

Effective home management of people with possible malaria,
Establishing treatment policies in the face of anti-malarial resistance,
Improving access to quality anti-malaria drugs,
Mapping malaria prevalence and predicting epidemics, and – importantly –
Tackling malaria within the context of complex emergencies.

Investments in intervention research and product development

The Roll Back Malaria project will try to establish an umbrella within which partners feel inspired to increase their strategic investments in better tools for rolling back malaria. This should result in

- Increasing support for priority intervention research within African institutions,
- Greater investment in the work of co-sponsored Tropical Disease Research programme,
- Effective synergy between the Roll Back Malaria initiative and MIM, and
- Political and financial backing for the new Medicines for Malaria Venture.
- Catalysis of other partnerships that involve commercial entities developing and marketing promising new products and making them accessible to those who need them.

We join others in proposing that it is now time for a new initiative to focus and co-ordinate the research effort to develop an effective malaria vaccine.

Criteria for judging the success of the roll back malaria partnership

Several criteria have been developed for judging the success of the Roll Back Malaria Partnership:
To what degree are country partnerships are being developed and owned by national authorities?
To what degree are strategies harmonized? Is technical guidance consistent and useful?
How well is the global partnership working?
Are issues of health sector development being taken into account at community and country level?
Is there additional strategic investment in research and product development?
To what extent are populations as a whole able to access better treatment, better protection?
In the longer term, is there evidence of a decline in malaria-related mortality and morbidity.

Success in rolling back malaria will only be possible if there is the fullest possible interaction and cooperation between the "control" community and researchers, and if researchers continue to ask tough questions about the intentions, technical strategy, programme plans and proposed outcomes for RBM. We will seek to institutionalise dialogue between the two communities during 1999-2000.

Principles that underlie the RBM initiative

Roll Back Malaria is not a project. Nor is it a programme. It is a movement -- a movement supported by a range of partners, and owned by the communities who contribute to the movement. I hope that the research community, and MIM, will become stakeholders in the RBM movement. Although decisions within the RBM global partnership are made by consensus, they are guided by a series of principles. One of these is that country priorities drive Roll Back Malaria. The partners will function independently yet in concert, and they will contribute where they have a comparative advantage or interest. At all stages, action

plans for all involved in rolling back malaria should be clear, science based, prioritized and adapted to local realities. Action to roll back malaria will involve broadening and strengthening the capacity of health sectors to fight all diseases. The ultimate objective is to reduce poverty and promote human development.

Challenges that we face: priorities for 1999

We face several substantial challenges. These include:

- Establishing a consistent world wide approach for rolling back malaria
- Ensuring that national authorities are in the lead
- Encouraging partners to respond to local situations in ways that reflect the local needs,
- Making maximum use of control tools that have been developed and tested at local level.
- Raising substantial additional resources -- $300 million per year extra for malaria related activity in Africa alone
- Ensuring that there is good investment in strategic and operational research – of the kind being encouraged by MIM
- Ensure that the new Medicines for Malaria venture is properly capitalized and can begin discovering and "proving the principle" of potential new antimalarials.

Priorities for the Roll Back Malaria project this year include

- developing the RBM concept,
- undertaking advocacy,
- mobilising resources,
- building the global partnership, and
- activating country level action.

Consensus building and inception

A series of consensus building and inception meetings, led by the WHO regional offices, is planned during the next three months. Intense efforts will be initiated

- to promote consistent support for capacity development and technical guidance
- to get more support into research and development and
- to monitor progress.

Over the next few days, I hope that colleagues here will join the effort to establish consensus around the Roll Back Malaria initiative. Do we agree that the goal is feasible, and the approach is valid? Can the approach be put into practice using current institutional arrangements? If not, what must be changed? How can we best build on ongoing activities, take account of research and other findings, and contribute to development of effective health sectors? How can we make sure that up to date information is available on what is happening? How to offer flexible technical support in a responsive manner, and procedures for mobilising resources? How to ensure that WHO itself is able to respond to the challenge?

Conclusion

We face a unique challenge. We have an extraordinary, once in a life-time, opportunity. There is a huge political momentum now to try once again to make a real difference to the malaria burden faced by the people of our world. After several months of analysis, synthesis and dialogue, I conclude that we can succeed. We **will** succeed if we focus relentlessly on the needs of millions of people, and dozens of countries, whose

development is undermined by malaria. That focus will inspire us to establish consensus, and then to work in synergy and true partnership. It may not be an easy task, but the prize is really worth fighting for. Let's get rolling.

At the start of his presentation, Dr Nabarro indicated that by March 1999, at least fifteen African Heads of State together with six governments in South East Asia were committed to the success of the global partnership to Roll Back Malaria. He then introduced a number of participants at the meeting who represented organisations involved in the partnership. They included Dr Welele Shasha, representing Dr Samba, WHO's Regional Director for the African Region; Dr Yao Kassankogno who leads the Malaria team in the WHO Africa Regional Office, and Dr Doyin Oluwale representing the Integrated Management of Childhood Illness team in the WHO Africa Region; Dr Ok Pannenborg, who represented the World Bank and Dr Kopano Mukelabai who represented UNICEF; Dr Dennis Carroll representing the United States Agency for International Development, Dr Guiseppe Masala and Dr Giancarlo Maiori, representing the Government of Italy; Caroline Sargeant, representing the UK Government; Dr Eva Maria Christophel from the University of Munich, who works on malaria with the German Government's international development assistance programme; and Dr Mary Galinski who represents the International Malaria Foundation. He paid tribute to Tore Godal, of WHO, who nurtured the Roll Back Malaria partnership to where it is at this time, and was the first manager of the WHO Roll Back Malaria project. He indicated that professional colleagues working within WHO, national governments and other partner organisations undertook much of the work being described.

BREAKOUT SESSIONS: MALARIA CONTROL AND ROLL BACK MALARIA

Programme

1. Malaria Control and RBM

Chair: Professor Marcel Tanner

Rapporteurs: Dr. Melville George, Dr. Halima Mwenesi

1. Putting Roll Back Malaria into Practice: An introduction - David Nabarro
2. Advocacy and Global partnership to Roll Back Malaria - Kopano Mukelabai
3. Overview of the Country needs assessment within RBM-AIM - Hans Remme
4. World Bank/WHO/UNICEF country needs assessment - J. McLaughlin
5. Health Sector development within the context of RBM-AIM - James Banda

2. Malaria Control and RBM

Chair: Dr Yao Kassankogno

Rapporteurs: Dr. James Banda, Dr Christian Lengeler

1. Funding mechanisms - John P. Clark and David Nabarro
2. Implementation of RBM-AIM - Raphael Gbary.
3. Capacity Building in Africa Region for Malaria control - Oladapo Walker.
4. Operational research within control programmes - Robert Guiguemdé

3. Malaria Control and RBM

Chair: Dr. Guy Barnish

Rapporteurs: Dr. Penny Phillips-Howard, Professor Oladapo Walker

1. Resource Networks within the context of RBM-AIM - Fred Binka
2. Indicators, monitoring and evaluation - Edwin Afari
3. Case control approaches to mortality impact - Jo Schellenberg
4. Measuring behavioural change during interventions - Margaret Gyapong